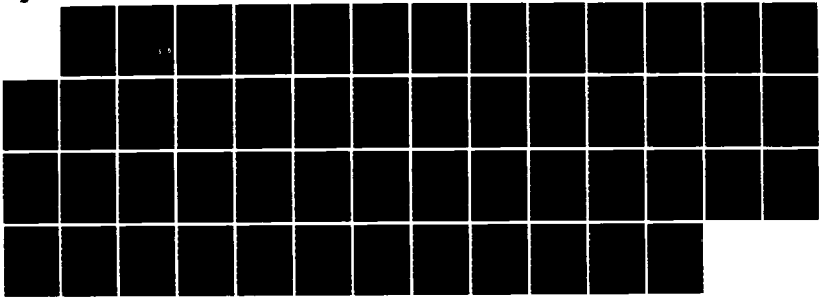
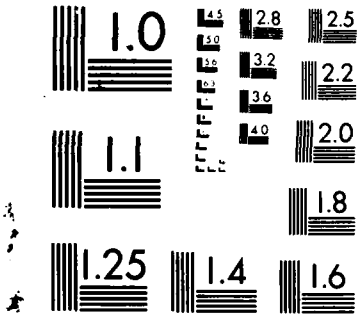
AD-A174 270 CONSIDERATIONS IN IDENTIFYING AND ATTACKING THE ENEMY'S 1/1
CENTER OF GRAVITY(U) ARMY COMMAND AND GENERAL STAFF
COLL FORT LEAVENWORTH KS SCHOO.. M J GRISWOLD
UNCLASSIFIED 14 MAY 86 F/G 15/7 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

(2)

Considerations in Identifying and Attacking the Enemy's Center of Gravity

by

Major Myron J. Griswold

School of Advanced Military Studies
U.S. Army Command and General Staff College
Fort Leavenworth, Kansas

14 May 1986

86-3608

Considerations in Identifying and Attacking the Enemy's Center of Gravity

by

Major Myron J. Griswold

School of Advanced Military Studies
U.S. Army Command and General Staff College
Fort Leavenworth, Kansas

14 May 1986

Approved for public release; distribution is unlimited

School of Advanced Military Studies
Monograph Approval

Name of Student: Myron J. Griswold

Title of Monograph: Considerations in Identifying and Attacking the Enemy's Center of Gravity

Approved by:

Robert M. Epstein, Ph.D. — Monograph Director, School of Advanced Military Studies

Colonel Richard Hart Sinnreich, M.A. — Director, School of Advanced Military Studies

Philip J. Brookes, Ph.D. — Director, Graduate Degree Programs

Accepted this 22nd day of May 1986

ABSTRACT

CONSIDERATIONS IN IDENTIFYING AND ATTACKING THE ENEMY'S CENTER OF GRAVITY, by Major Myron J. Griswold, USA, 44 pages.

Central to the design and conduct of campaigns and major operations is the concept of center of gravity. However, a thorough understanding of this concept seems to be lacking within the U.S. Army. While some of this misunderstanding exists because of the Army's overall unfamiliarity with operational art, much of it can be traced to the inherent complexity of the concept of center of gravity. Therefore, the purpose of this study is to discern the key considerations that operational level commanders and planners must understand to identify and attack the enemy's operational center of gravity.

Following an evaluation of the theoretical propositions of Clausewitz and Jomini that pertain to the concept of center of gravity , the study analyzes in detail two World War II operations - the 1941 Crusader and 1942 Bustard Hunt operations - in order to identify insights and lessons applicable to center of gravity at the operational level. The analysis discloses that the enemy's operational center of gravity, his source of strength or balance, is always some mass of his overall force - a mass capable of producing a decision that has operational consequences. This mass is a major formation, such as a division, corps, army, or group of armies, that is the main element of a larger force's power for undertaking decisive offensive or defensive action within a theater of operations. Additionally, the best way to attack the enemy's operational center of gravity is for commanders to use an indirect approach in which they concentrate combat power at the most decisive point or points within a theater of operations. Finally, the protection of one's own center of gravity requires the skillful application of the principles of security and surprise. In this regard, it is particularly important to protect one's own center of gravity from the air attacks of an opposing force.

TABLE OF CONTENTS

INTRODUCTION

The operational level of war as currently defined by the U.S. Army is the level responsible for "the employment of military forces to attain strategic goals in a theater of war or theater of operations through the design, organization, and conduct of campaigns and major operations."[1] In other words, commanders and planners at the operational level must "sequence tactical activities and events to achieve decisive objectives."[2] As an integral part of AirLand Battle doctrine, the operational level of war (operational art) requires that U.S. Army commanders and planners understand as much about this activity as they can. In particular, these operational decision makers must know how to design and conduct campaigns and major operations.

Central to the design and conduct of campaigns and major operations is the concept of center of gravity. Center of gravity is "that capability, characteristic, or locality from which an armed force derives its freedom of action, physical strength, or will to fight."[3] Furthermore, identifying the enemy's operational center of gravity, his source of strength or balance, and concentrating superior combat power against that point to achieve a decisive success is the essence of operational art.[4]

However, a thorough understanding of this concept and its importance seems to be lacking within the U.S. Army. Specifically, U.S. Army operational level commanders and planners do not have a firm enough understanding of what factors they must be aware of in identifying and attacking the enemy's center of gravity. While some

of this misunderstanding exists because of the Army's overall unfamiliarity with operational art, much of it can be traced to the inherent complexity of the concept of center of gravity. For example, officers studying the operational art at the U.S. Army School of Advanced Military Studies frequently raise and discuss certain questions relating to this key concept of operational design: Is the center of gravity always the mass of the enemy force, and what are the implications of selecting the wrong center of gravity? Is it best to attack the enemy's center of gravity directly or indirectly? What is the relationship between protecting one's own center of gravity and attacking the enemy's source of strength or balance? Answers to these questions are not self evident, but they can be found by researching and analyzing modern campaigns and major operations. Through this process of historical analysis, one can discern the key considerations that operational level commanders and planners must understand to identify and attack the enemy's operational center of gravity.

To reach a determination on what these considerations are, it is appropriate to analyze a few significant major operations from the Second World War. Specifically, the 1941 Crusader operation and the 1942 Bustard Hunt operation provide an excellent basis for studying the concept of center of gravity. Indeed, many aspects of these major operations reflect conditions under which current AirLand Battle doctrine envisions the commitment of U.S. forces to combat on any future battlefield. Such combat is likely to be fast moving, lethal, non-linear, and fluid.5

Prior to conducting this historical analysis, it is necessary to examine the theory associated with the concept of center of

gravity. The ideas of Clausewitz and Jomini serve to place this concept in its proper perspective, thereby helping to guide and make more meaningful the subsequent analysis of the major operations from World War II.

As one of the two chief interpreters of Napoleonic warfare, Clausewitz (1780-1831) had a profound influence on military thought and doctrine in Europe and the United States. In describing the conduct of Napoleon's campaigns and battles, Clausewitz used several key concepts that still have validity today. One of the most important of these concepts is "center of gravity." Clausewitz used this concept to clarify more precisely what he meant by defeating the enemy. Specifically, in his monumental work, On War, Clausewitz says the following:

> One must keep the dominant characteristics of both belligerents in mind. Out of these characteristics a certain center of gravity develops, the hub of all power and movement, on which everything depends. That is the point against which all our energies should be directed.6

The concept of center of gravity is one of the most important of Clausewitz's theories, because it determines the strategic and operational aims of a war. Therefore, in discussing the concept, Clausewitz focuses his attention on describing what the center of gravity is and how best to attack it at the strategic and operational levels of war.

At the strategic level Clausewitz identifies five possible centers of gravity for a nation waging war. The center of gravity can be a nation's army, capital, the army of the nation's protector, a key ally, or public opinion. To achieve success in war, a nation must direct the preponderance of its military means against one of

these centers. "Not by taking the easy way ... but by constantly seeking out the center of his power, by daring all to win all, will one really defeat the enemy."7

A nation's failure to identify an enemy's strategic center of gravity correctly can lead only to inconclusive or disastrous results in war. In Vietnam, the United States had no chance of achieving victory since it "had adopted a strategy that focused on none of the possible North Vietnamese centers of gravity - their army, their capital, the army of their protector, the community of interest with their allies, or public opinion."8 In contrast, North Vietnam was very adept in identifying and attacking their opponent's center of gravity. Initially, "the center of gravity that they identified was the alliance between the United States and South Vietnam."9 In 1968, North Vietnam's TET offensive "struck what was to prove a fatal blow against this center of gravity."10 Subsequently, upon the United States withdrawal from Vietnam in 1973, the North Vietnamese recognized that the center of gravity had shifted to South Vietnam's armed forces. In fact, destroying this center of gravity was the focus of North Vietnam's final and successful offensive during the Spring of 1975.

Arguably, the defeat of South Vietnam's regular army during this offensive demonstrated the degree to which the North Vietnamese senior generals understood Clausewitz's comments about the center of gravity: "Still no matter what the central feature of the enemy's power may be ... the defeat and destruction of his fighting forces remains the best way to begin, and in every case will be a very significant feature of the campaign."11 In this regard, the remarks of North Vietnam's field army commander for their 1975 Spring

offensive are interesting: "The basic law of the war," said General Dung, "was to destroy the enemy's armed forces, including manpower and war material ... the main target of our forces was the (South Vietnamese) regular army."[12]

This focus on destroying the enemy's armed forces is also the foundation for Clausewitz's ideas on the center of gravity at the operational level of war. Within a theater of operations, the belligerents' fighting forces "will possess certain centers of gravity, which by their movement and direction, govern the rest; and those centers of gravity will be found wherever the forces are most concentrated."[13] It is with a blow against these centers of gravity that an operational commander can expect to gain "the broadest and most favorable repercussions."[14] Indeed, according to Clausewitz the decisiveness of a victory within a theater of operations depends ultimately on the size of the defeated force.[15] Interestingly, this viewpoint coincides directly with another of Clausewitz's ideas - namely, that the objective of war is the destruction of the enemy armed forces in battle.[16]

In another regard, Clausewitz recognizes the challenge operational commanders face in discerning the enemy's center of gravity within a theater of operations. "One will constantly be called upon to estimate the effect that an advance or retreat by part of the forces on either side will have upon the rest."[17] Additionally, in many instances commanders will have to distinguish between two or more masses of the enemy force (e.g., several allied armies during the Napoleonic wars). In making this decision, Clausewitz urges commanders to scrutinize closely the cohesiveness of the different enemy masses and the character of their commanding

generals. In most cases, the more cohesive - ergo, the more formidable - of the enemy masses will be the center of gravity for a campaign or major operation.[18] However, on other occasions, the character of a particular general may cause the center of gravity to lie with his command. Despite these challenges, by tracing the enemy's strength back to one source of power, a commander has taken the necessary first step in producing a situation whereby ultimately his force can achieve a decisive victory within theater.

Furthermore, a decisive victory is a distinct possibility if an operational commander can identify the enemy's precise center of gravity and expose it to attack and destruction by the mass of his own force. Clausewitz makes this point very clearly when he says, "... any decision obtained by the main force in a particular theater directly affects the whole and carries everything along with it."[19]

An analysis of Clausewitz's ideas on the best way to attack the enemy's operational center of gravity, reveals his emphasis on the principles of mass, economy of force, and maneuver.[20] A successful attack on the enemy's "hub of all power and movement" requires a commander to concentrate as many forces as possible in his own center of gravity. However, in employing these forces it is not necessary or desirable to use them against the enemy's center of gravity directly. Rather, it is more effective to possess superior strength at some decisive point within the theater of operations. Although Clausewitz does not devote much time to analyzing where and what the decisive point might be, he does believe that great advantages accrue to the army which can attack an enemy from the flank, "thereby forcing him to fight a battle with a change of front."[21]

In essence, Clausewitz is advocating the utility of Napoleon's la manoeuvre sur les derrieres (the advance of envelopment), "which can also be called, in Liddell Hart's terminology, the indirect approach."[22] A critical aspect of this form of operational maneuver was the commander's ability to attain the correct balance between mass and economy of force. "The forces available must be employed with such skill that even in the absence of absolute superiority, relative superiority is attained at the decisive point."[23] "On the other (hand), any excess (strength), is to be regarded as a decided disadvantage, since it involves a waste of energy, which in turn means a lack of strength elsewhere."[24] With la manoeuvre sur les derrieres, the decisive point was in the enemy's rear astride his main Line of Communication (LOC), while secondary areas of effort were along the enemy's front and behind Napoleon's main force.

As the other principal interpreter of Napoleon's campaigns and battles, Jomini (1779-1869) also had a vast impact on the art of war in Europe and the United States. In describing Napoleonic warfare, Jomini used several key concepts which are as relevant today as they were 175 years ago. One of the most significant of these concepts consists of directing superior combat power to the most decisive point within a theater of war or zone of operations. In order to gain a better understanding of the relationship between the concepts of decisive point and center of gravity, it is instructive to examine Jomini's writings on the former. This examination is not a difficult task since Jomini devotes several chapters of his seminal work, The Art of War, to a discussion of how to select and attack the decisive point.

Selection of a decisive point requires knowledge of what and where it might be. According to Jomini, "the name of decisive strategic point should be given to all those which are capable of exercising a marked influence either upon the result of the campaign or upon a single enterprise."[25] Jomini divides these "all important" points within a theater of war or zone of operations into two categories: geographic decisive points and decisive points of maneuver. Geographically decisive points, such as rivers, defiles, heights, fortresses, and capitals, have permanent importance and are "a consequence of the configuration of the country."[26] Decisive points of maneuver "result from the positions of the troops on both sides and are generally on that flank of the enemy upon which, if his opponent operates, he can more easily cut him off from his base and supporting forces without being exposed to the same danger."[27] Alternatively, a decisive point of maneuver might be found at the center of an enemy force, particularly if its front is overextended.

In deciding which decisive point or points to select as an operational objective, a commander must assess the overall aim and military capability of his campaign and forces respectively. In situations where acceptance of risk is not possible, "it may be prudent to aim only at the acquisition of partial advantages," - such as the capture of an important fortress or possession of a key river line.[28] On the other hand, "where a party has the means of achieving a great success by incurring great dangers, he may attempt the destruction of the hostile army, as did Napoleon."[29] In this case, it is appropriate for a commander to select one of Jomini's decisive points of maneuver as a campaign objective. This objective is the point where a commander plans on focusing superior combat

power in order to gain leverage and facilitate the destruction of the enemy's main body. In essence, by using decisive points of maneuver, an operational commander is attacking the enemy's center of gravity indirectly.

The theoretical propositions discussed above provide an excellent basis for conducting an historical examination of the center of gravity concept. Therefore, it is the purpose of this paper's next two sections to use two World War II operations as a vehicle for identifying insights and lessons applicable to center of gravity at the operational level.

Both Crusader and Bustard Hunt took place in theaters of operations that were isolated geopraphically from other campaigns, resulting in a relatively "pure" operational environment, conducive to studying the concept of center of gravity in depth. In particular, there is evidence to suggest that such a study will illustrate several important points: First, at the operational level the center of gravity is some mass (i.e., some major formation or component) of the enemy's force. Second, it is best to attack the enemy's center of gravity indirectly by concentrating combat power at a decisive point in theater. Third, protection of one's own center of gravity requires the skillful application of the principles of security and surprise.[30] To supplement the following text, maps for Crusader and Bustard Hunt are attached as appendices A and B respectively.

CRUSADER

The offensive code-named Operation Crusader began in November 1941 and consisted of the second major attempt by the Allies to

relieve the North African port city of Tobruk. The Allied and Axis forces engaged consisted of contending field armies, Eighth Army and Panzergruppe Afrika respectively. Crusader provides an excellent opportunity to study the center of gravity concept from the perspective of rival operational commanders employing large mobile forces in a fast moving, fluid, and lethal combat environment.

After Operation Battleaxe in June 1941 both the Allied and Axis forces in North Africa were involved in substantial reorganization and refitting efforts.[31] On the Allied side, "General Sir Claude Auchinleck replaced Wavell as commander of the Middle East in July 1941, while the remnants of the British Western Desert Force were redesignated as the Eighth Army in August 1941, under the command of Lieutenant General Sir Alan Cunningham."[33] The Eighth Army's major subordinate units were the XIII and XXX Corps. XIII Corps consisted of the 4th Indian Division, New Zealand Division, and 1st Tank Brigade. XXX Corps consisted of the 7th Armored Division, 4th Armored Brigade Group, 1st South African Division, and 22nd Guards Brigade. The forces in Tobruk consisted of the 70th Infantry Division, 32nd Army Tank Brigade and a Polish regiment. The Army reserve consisted of the 2nd South African Division and 29th Infantry Brigade Group.[33]

On the Axis side, General Erwin Rommel was appointed commander of Panzergruppe Afrika in July 1941. Panzergruppe Afrika's major subordinate units were the German Afrika Korps, commanded by Generalleutnant Ludwig Cruewell, the Italian XXI Corps, and the Italian Armored Corps. Cruewell's Korps consisted of the 15th and 21st Panzer Divisions and the Afrika Division (an infantry division, redesignated later as the 90th Light). The Italian XXI Corps

consisted of five infantry divisions, while the Italian Armored Corps consisted of the Ariete Armored Division and the Trieste Motorized Division.[34]

Early in November 1941 both the Axis and Allied forces were preparing to resume the offensive in North Africa. At this time, Rommel identified the Allied operational center of gravity as the garrison defending the port city of Tobruk. Rommel's selection of this part of the enemy force as the center of gravity is understandable, considering its effect on his operational flexibility. The Tobruk garrison was a constant threat to Panzergruppe Afrika's left flank and rear. If Rommel did not invest Tobruk with a sufficient number of forces, he could expect the very formidable British garrison to launch an attack along his already vulnerable LOC. Therefore, he was obliged to invest Tobruk with four Italian divisions and three German battalions from the frontier area. As a result, Rommel could not concentrate his Panzergruppe at the frontier - a necessary precondition for launching an offensive into Egypt. Additionally, if Rommel could take Tobruk he would improve the Axis supply situation considerably.

Therefore, the destruction of the Tobruk garrison became the focus of Rommel's operational effort. Accordingly, on 16 November he concentrated six of his ten divisions in the vicinity of Tobruk - a geographically decisive point within the North African theater. "The assault proper was to be made by the 90th Light Division, 15th Panzer Division, and two Italian infantry divisions, while the seige of Tobruk was maintained by the Italian Brescia and Trento Divisions."[35] As the most heavily concentrated and cohesive (two of the three divisions in Panzergruppe Afrika) of Rommel's formations,

this assault force was the Axis center of gravity. To protect it, Rommel chose to use the 21st Panzer and Ariete Armored Divisions in an economy of force and security role to stop or slow down British forces attacking out of Egypt. In Rommel's estimation any such attack would involve a wide sweep around the static Axis frontier positions, thereby allowing these two armored divisions to conduct operational maneuver and strike the enemy along his vulnerable LOC.[36]

However, before Rommel could execute his plan for assaulting Tobruk, the British Eighth Army began Operation Crusader on 18 November. General Cunningham's plan was to attack and defeat Panzergruppe Afrika in order to relieve Tobruk and reoccupy Cyrenaica and Tripolitania. A defeat of Rommel's forces would permit the Royal Air Force to occupy airfields in Libya, thereby extending British air influence well into the central Mediterranean for the purpose of easing pressure on Malta and threatening Italy with invasion.[37] "The key to accomplishing this had not changed since Battleaxe, Rommel's armor, particularly his two German panzer divisions, had to be destroyed."[38]

In fact, the German Afrika Korps was the operational center of gravity of Rommel's forces during Crusader, because of the capabilities of Axis forces and the uniqueness of desert warfare. In North Africa the tank was all important because it was the one weapon system by which significant combat power could be projected over the vast and open desert terrain in relatively short periods of time. Through the skillful maneuver of large tank formations, commanders could compel the enemy to change direction and accept battle under less than favorable conditions. Therefore, armored

brigades, divisions, and corps were the key to winning or losing major operations - the decisiveness of either outcome being determined by the number of tanks destroyed.

In this regard, there was a vast difference between the number of German and Italian tanks, and the quality of their armored units. For example, the Afrika Korps had almost two-thirds of the tanks in Panzergruppe Afrika. Additionally, although the Italian Armored Corps had 154 tanks, they were of inferior quality to the German armor. The Italian formations also suffered from poor leadership and a lack of anti-armor weapons. On the other hand, German tank formations were well led and supported by very effective antitank weapons, such as 88mm guns. From the beginning of the Crusader planning process, General Cunningham had recognized the importance of focusing his Army's operational effort on the Afrika Korps. He said as much at a pre-operation press conference: "I am going to seek old Rommel out and destroy him and his armour."39

To defeat Rommel's center of gravity, Cunningham's plan revolved around winning a decisive tank battle. Specifically, XIII Corps would fix the Axis frontier formations while XXX Corps moved south around these formations, then turned northwest to engage the Axis armor near Tobruk (Gabr Saleh). Additionally, the 4th Armored Brigade was detached from the 7th Armored Division to serve as a flank guard to XIII Corps. In essence, Eighth Army would attack on three divergent approaches. Once the the Axis armor was defeated the siege of Tobruk would be lifted in coordination with an attack by the garrison.

However, in many respects Cunningham's plan reflected his misunderstanding of the interrelationship between mass and economy

of force in achieving sufficient concentration at the decisive point in theater. For example, the dispositions of XXX Corps, XIII Corps, and 4th Armored Brigade committed Eighth Army to an attack in which only two tank brigades were capable of engaging the Axis center of gravity. In effect, the formation conducting Cunningham's main effort (i.e., XXX Corps) could strike a blow against the Afrika Korps with only a fraction of the total armored force participating in the offensive.

Furthermore, the Crusader plan depended on the assumption that Rommel would accept battle at Gabr Saleh, an area of no military significance to the Germans. In retrospect, this assumption was faulty at best. As J.F.C. Fuller points out: "In order to bring the enemy armour to battle, it is necessary to attack an objective which is of such importance that the enemy must protect it."42 During Crusader the most important objective was the area around Sidi Rezegh, dominating as it did both the Axis LOC to the frontier garrisons and approaches to Tobruk. In fact, Sidi Rezegh was both a geographic decisive point and a decisive point of maneuver. Therefore, to destroy the Axis center of gravity the British forces should first have been concentrated on Sidi Rezegh, either to await the inevitable attacks of Afrika Korps or begin an advance by echelon on Tobruk.

On the 20th of November Rommel decided to switch the focus of his operational effort from the Tobruk garrison to XXX Corps. This shift is another demonstration of Rommel's ability to identify and attack successfully the enemy's operational center of gravity. Once Crusader began, the 7th Armored Division was the British operational center of gravity. This statement is understandable considering the

size and strength of the 7th Armored Division vis-a-vis other Eighth Army formations, and the direction of XXX Corps' advance. Of all British formations, the 7th Armored Division was the most formidable, since it had three of the Eighth Army's five tank brigades. By the 20th of November, 7th Armored Division had one of its tank brigades and a support group on the escarpments at Sidi Rezegh, the decisive point in theater.41

The location of these units deep in Axis territory occurred because the British were successful in protecting the 7th Armored Division during its advance to the Gabr Saleh-Sidi Rezegh- Bir el Gobi area on 18 and 19 November.[42] Essentially, British security and deception measures prior to Crusader were invaluable in allowing the XXX Corps' attack to achieve tactical surprise. Extensive camouflage efforts, night movements, and wireless silence were so effective that 7th Tank Brigade and 7th Support Group held the airfield at Sidi Rezegh and were in position to attack Rommel's armor, LOC, or investing force at Tobruk. In light of this development, Rommel instructed Cruewell on 21 November to move his Afrika Korps towards Sidi Rezegh to attack and destroy the lead elements of the 7th Armored Division.

Thus, during the period 21-23 November an armored battle was fought on and around the escarpments of Sidi Rezegh. Rommel's plan was to concentrate Afrika Korps in an effort to defeat the enemy formations sequentially, until finally the entire British XXX Corps had been destroyed. This was a sound plan since the XXX Corps had shown no real desire or ability to concentrate the 7th Armored Division at Sidi Rezegh to defeat the Axis center of gravity. In fact, by 20 November the destruction of Afrika Korps was no longer

the sole focus of Cunningham's operational effort. Instead, he sought simultaneously to lift the siege of Tobruk, fight the Afrika Korps, and continue the attack against Rommel's frontier formations. This decision resulted in a continuous dispersal of Eighth Army tank units which, in many instances, were relegated to the traditional British role of supporting and protecting the infantry. In effect, Cunningham created a situation in which a decisive victory over Rommel's forces became problematic, because of the 7th Armored Division's inability to strike the Axis center of gravity with anything more than a series of rather weak and ineffectual blows. This permitted Cruewell to achieve a series of small successes, and eventually led to victory in one of the most significant tank battles of the campaign - a battle in which about eighty percent of XXX Corps' armor was destroyed.

On 24 November, the day after the Axis victory at Sidi Rezegh, General Cruewell recommended to Rommel that Afrika Korps be allowed to complete the destruction of XXX Corps which had withdrawn southward to the Gabr Saleh area. Rommel however had another plan in mind: He would seek "to exploit his success by a deep thrust to and over, the frontier - into the rear area of the Eighth Army - with all his mobile forces."[43] Rommel's aim was to destroy the Eighth Army, rather than simply attacking British logistics. "To do this he planned to cut the line of retreat of the 30th Corps, and drive the 4th Indian Division into the Sollum minefields."[44] In essence, Rommel chose to employ operational maneuver to focus superior combat power at a decisive point of maneuver (i.e., the

Eighth Army LOC) in order to force XIII Corps and the remaining units of XXX Corps to fight a battle with a change of front.

Therefore, in maneuvering against the Eighth Army's rear, Rommel was trying to destroy the British center of gravity indirectly. After the apparent destruction of 7th Armored Division on 23 November, a new center of gravity in the Eighth Army developed. By combining the remnants of 7th Armored Division, the 32nd Army Tank Brigade from the Tobruk garrison, and 2nd New Zealand Division, an armored force of well over 150 tanks was formed.[45] The forming of this composite force of one heavily reinforced division was possible because the Afrika Korps had withdrawn from the critical Sidi Rezegh-Tobruk area, and therefore recreation of the Eighth Army's center of gravity was accomplished without interference or pressure. The final element in the recreation of the British center of gravity was General Auchinleck's refusal to give up the attack. Specifically, on 23 November General Auchinleck overruled Cunningham's decision to abandon the offensive, telling him instead to "continue to attack the enemy relentlessly using all your resources even to the last tank."[46] Only Auchinleck's insistence that Crusader continue prevented the offensive from ending in a British retreat on 24 November.[47]

Rommel's maneuver upon the Eighth Army's rear was unsuccessful because it failed to destroy the British center of gravity. Because of British superiority over the Axis forces in aircraft, tank reserves, and number of units, Auchinleck was confident enough to disregard Afrika Korps' thrust towards the frontier during the period 24-26 November. Essentially, the Afrika Korps did not sufficiently threaten the Eighth Army's LOC, as evidenced by the

rapid reconstitution of 7th Armored Division during this time period. By the 26th of November, this division had fielded another eighty tanks, thereby increasing the total number of British tanks in the Sidi Rezegh-Tobruk area to just over 250. Because of this superiority in armored combat power, Rommel was unable to compel the remnants of 7th Armored Division, the 32nd Army Tank Brigade, and 2nd New Zealand Division to turn and fight to re-open Auchinleck's LOC on terrain of Rommel's choosing.

In essence, Rommel's thrust towards Egypt before completing the destruction of this British center of gravity was a mistake and demonstrates clearly that an enemy's LOC is not an operational center of gravity. Although his thrust caused a great deal of confusion and panic in the British rear area, it was incapable of producing a decisive victory unless the British center of gravity withdrew from the Sidi Rezegh-Tobruk area in an attempt to eliminate the threat to Eighth Army's LOC. Specifically, in order to gain the "broadest and most favorable repercussions," Rommel knew he must engage the most concentrated mass of British forces - the one reinforced division operating in the Sidi Rezegh-Tobruk area.48 However, he did not want to confront this formation directly and risk the possibility of engaging in a prolonged battle of attrition. Therefore, Rommel used an indirect approach in which he attacked a decisive point, the enemy's LOC, with his center of gravity, in order to dislocate the British center of gravity and force it to accept battle under unfavorable conditions.

Unfortunately for the Axis forces, certain circumstances existed that prevented Rommel from achieving this dislocation. First, he did not have enough units to perform an effective economy

of force to stop or slow the advance on Tobruk of 2nd New Zealand Division. Second, from an Axis perspective, the British superiority in number of tanks, aircraft, and reserve units began to impact adversely on opposing force ratios. In fact, during the period of 24-26 November the Eighth Army grew considerably stronger, while Panzergruppe Afrika became progressively weaker.

Of particular concern to Rommel was the inability of the Axis Air Force to protect his center of gravity adequately during its foray towards Egypt. By the time Afrika Korps returned to the Sidi Rezegh-Tobruk area they had been gravely weakened by the unrelenting strikes of the Royal Air Force. Rommel did not have any tank reserves to rebuild the combat strength of Afrika Korps, therefore it was largely ineffective from 27 November until 7 December. On this date, Rommel could no longer ignore the weakened condition of Afrika Korps or the reconstituted 7th Armored Division, therefore he ordered a general withdrawal of Axis forces from the Tobruk area. In essence, the British achieved a decisive victory by defeating the Axis operational center of gravity.

BUSTARD HUNT

The offensive code-named Operation Bustard Hunt began in May 1942 and consisted of a major attempt by the Germans to reconquer the Kerch Peninsula in Crimea. The German and Soviet forces engaged consisted of the Eleventh Army and Crimean Front respectively. Bustard Hunt is an excellent vehicle to use in studying the center of gravity from the viewpoint of rival operational commanders employing large forces in a strongly contested and strategically important theater of operations.

After the last Soviet offensive designed to break the stalemate along the Parpach Isthmus had stalled on 11 April 1942, the German Eleventh Army commander, General von Manstein, prepared to resume the offensive in Crimea. At this time, Manstein identified the Soviet's center of gravity as the forces defending the Kerch Peninsula, rather than the garrison defending the port city of Sevastopol. Manstein's selection of this mass of the enemy force as the center of gravity is understandable, considering its strength vis-a-vis the Sevastopol garrison and the Soviet capability to reinforce the Kerch Peninsula. Sevastopol was defended by the Soviet Coast Army which consisted of eight divisions, whereas on the Kerch Peninsula there were three Soviet armies - the Forty-fourth, Forty-seventh, and Fifty-first - consisting of eighteen divisions and eight other combat formations, mostly of brigade or regimental size. More important, the Soviets could reinforce these three armies rather quickly by moving units from the Caucasus region across the Kerch straits into Crimea. On the other hand, reinforcement of Sevastopol had to occur via the Black Sea; however, this was a difficult task because of Luftwaffe attacks on the Soviet Black Sea Fleet and its bases. Considering these circumstances, it was questionable whether Eleventh Army had sufficient forces both to concentrate in western Crimea and to contain the Soviet center of gravity on the Kerch Peninsula. Moreover, if the Kerch armies were destroyed, the Sevastopol garrison would die on the vine.

Having made the decision to attack the Soviet armies on the Kerch Peninsula first, Manstein knew he must employ as strong a force as possible against them in order to achieve a rapid and decisive victory. Accordingly, he concentrated seven divisions at

Parpach. The German XXX Corps consisted of the 50th, 132nd, and 170th Infantry Divisions, the 28th Light Division, and the 22nd Panzer Division. The German XXXXII Corps consisted of the 46th Infantry Division, while the 18th Rumanian Division and 8th Rumanian Cavalry Brigade were assigned to the Rumanian VII Corps. Manstein's other four divisions were left at Sevastopol in an economy of force role to continue their investment of the fortress.49

On the Soviet side, General Kozlov was the commander of the Crimean Front which consisted of the three Soviet armies on the Kerch Peninsula. These armies occupied defensive positions across the entire eleven mile width of the Parpach Isthmus. The Forty-fourth Army, consisting of six divisions, occupied the southern portion of the Parpach line between the Black Sea and Koy Assan. The Fifty-first and Forty-seventh Armies, consisting of twelve reinforced divisions, occupied the northern portion of the Parpach line which extended from Koy Assan through Kiet, and then up to the Zivash (i.e., the so-called Lazy Sea). Significantly, all but two of these eighteen divisions were deployed within 3 or 4 kilometers from the front line.50

In preparing the Eleventh Army's plan to attack the Crimean Front, Manstein recognized the Soviet's operational center of gravity as the Soviet Fifty-first and Forty-seventh Armies. His selection of this mass of the enemy force as the center of gravity is understandable, considering its great strength and location in relation to the Forty-fourth Army. Two-thirds of the divisions in the Crimean Front were concentrated in these two Soviet armies, contiguous to each other in the northern portion of the Parpach Isthmus. If these two armies were destroyed, the offensive power of

the Crimean Front would be broken. Moreover, almost all of these divisions were located inside a salient which extended westward well beyond the southern portion of the Parpach line being held by Forty-fourth Army. This salient had developed as a result of earlier Soviet offensives, and Kozlov felt certain that any German attack would aim at cutting it off.

From an operational perspective, Manstein could ill afford not to take advantage of this salient, particularly in light of the geographic configuration of the Kerch Peninsula. He understood that to offset Soviet numerical superiority, the Eleventh Army must destroy the forces inside the salient quickly, before they withdrew into the broader part of the peninsula. As long as the Fifty-first and Forty-seventh Armies maintained positions along the narrow Parpach Isthmus, it would be impossible for them to employ the bulk of their forces simultaneously.

Therefore, the destruction of these two northernmost Soviet armies became the focus of Manstein's operational effort. Accordingly, he chose to attack this center of gravity in an indirect manner by applying skillfully the principles of mass, economy of force, and maneuver. For example, Manstein concentrated five of his seven divisions in the XXX Corps, the formation conducting the Eleventh Army's main attack. Using three of its divisions, this corps would penetrate the Parpach line in the south rapidly, thereby creating a gap for the 22nd Panzer and 170th Infantry Divisions to swing north to the Sea of Azov and cut off the two northernmost Soviet armies.51 To prevent a Soviet withdrawal or counterattack before completion of the XXX Corps breakthrough, the

XXXXII and VII Rumanian Corps would conduct a supporting attack to fix all enemy forces in the Parpach salient.

Essentially, Manstein knew that he had to engage the Soviet's operational center of gravity in order to achieve a decisive victory - one in which the Kerch Peninsula was cleared of all Soviet forces. However, he did not want to confront the two northernmost Soviet armies directly and risk the distinct possibility of outright defeat or engaging in an extended battle of attrition. Therefore, Manstein used an indirect approach in which he attacked two decisive points in order to gain leverage and facilitate the destruction of the Crimean Front. The first decisive point was located along a narrow segment of the weakly defended southern portion of the Parpach line, while the second decisive point was on the left flank and rear of the Fifty-first and Forty-seventh Armies.

The Eleventh Army's center of gravity during Bustard Hunt was the XXX Corps. The size, strength, cohesion (all five divisions were German), and direction of attack of this German formation attest to this statement. However, during the three to four weeks before Bustard Hunt began, it would have been difficult for Kozlov to identify XXX Corps as the German center of gravity because of the actions taken by Manstein to protect it. Specifically, during late April and early May both XXXXII and VII Rumanian Corps carried out extensive "deception measures along their sectors of the front to reinforce the Soviet belief that the attack would come against the bulge on the north flank of the Parpach line."[52] False wireless messages, fake reconnaissance assaults, sham artillery preparations, and demonstrations were successful apparently in convincing

substantial numbers of reserves in the north to stay in position until it was too late for them to move.

Perhaps more important from the Soviet perspective, once Bustard Hunt began on 8 May, Kozlov was never able to shift the focus of his operational effort from the German and Rumanian forces in the north to the XXX Corps in the south. This situation developed primarily because of the inability of the Soviets to protect their center of gravity adequately. For example, by gaining air superiority in theater almost immediately after Eleventh Army began the offensive, the Luftwaffe caused great problems for the Soviets, particularly with the command and control of their reserves. Specifically, the German VIII Air Corps damaged or destroyed many uncamouflaged and unhardened command posts, thereby disrupting communications and hampering Kozlov's ability to launch an operational level counterattack against XXX Corps. The air attacks caused so much confusion at all levels of Soviet command that, by late evening on 8 May, "every Soviet formation was engaged with the exception of one rifle and one cavalry division."53 Consequently, by the second and third days of the offensive there were not enough Soviet units available to generate an effective reserve at Front level. In essence, Manstein attacked his enemy's vulnerable command posts in order to disrupt the capability of Soviet commanders to command and control their forces effectively, thereby facilitating in an indirect manner the destruction of the Crimean Front center of gravity.

Another factor contributing to Kozlov's difficulties in shifting the focus of his operational effort was the speed with which XXX Corps executed Manstein's plan. Here again, the ability

of the Luftwaffe to protect this operational center of gravity, by providing adequate and responsive support, was instrumental in sustaining the momentum of Manstein's advance. In particular, the VIII Air Corps assisted the 22nd Panzer Division greatly in repelling a number of strong local counterattacks by Soviet tank units.[54] As a result, the 22nd Panzer Division reached the Sea of Azov three days after the start of Bustard Hunt, thereby completing the encirlement of eight Soviet divisions on the northern flank of the Parpach front. In essence, the Germans achieved a decisive victory by defeating the Soviet's operational center of gravity.

CONCLUSIONS

The purpose of this study was to discern the key considerations that operational level commanders and planners must understand to identify and attack the enemy's operational center of gravity. In this endeavor two major operations from World War II were analyzed in some detail. From this analysis a number of insights and lessons relating to the center of gravity have been identified.

The enemy's operational center of gravity - his source of strength or balance - is always some mass of his overall force. This mass is a major formation, such as a division, corps, army or group of armies, that is waging war as part of a larger force within a theater of operations. For example, during the initial stages of Crusader, Rommel and Cunningham identified each other's principal armored formations, 7th Armored Division and Afrika Korps, as the centers of gravity against which to focus their operational efforts. These formations were selected as centers of gravity because of their great effectiveness in performing the key combat tasks of

desert warfare, and the inexorable advance of 7th Armored Division into the critical Sidi Rezegh-Tobruk area. Additionally, for several days after the virtual destruction of 7th Armored Division, the British center of gravity lay with a composite formation consisting of remnants of the 7th Armored Division, the 32nd Army Tank Brigade, and 2nd New Zealand Division. The center of gravity had shifted to this particular Eighth Army formation because of its great tank strength and dogged advance on Sidi Rezegh, the decisive point in the theater, and General Auchinleck's indomitable spirit and fierce determination to continue the offensive in spite of Rommel's significant tactical victories. Finally, during Bustard Hunt, the two northernmost Soviet armies, the Fifty-first and Forty-seventh, and the German XXX Corps were selected as centers of gravity because of such factors as their size, strength, location, cohesion, and direction of advance vis-a-vis other major formations within the Crimean Front and German Eleventh Army respectively. In sum, the operational center of gravity is really the main element of an army's power for undertaking decisive offensive or defensive action. It is a dynamic mass - capable of producing a decision that has operational consequences.

The implications of selecting the wrong operational center of gravity were evident during the Bustard Hunt operation. While Manstein identified the Soviet's center of gravity on the Kerch Peninsula correctly, and was therefore able to devise a suitable course of action for attacking it, Kozlov never did recover from his initial selection of the wrong center of gravity - the German XXXXII and Rumanian VII Corps. More specifically, because of Manstein's speed of execution and the insufficiency of Soviet protective

measures, Kozlov's two northernmost armies were defeated before he had a chance to switch the focus of his operational effort to the German XXX Corps on the southern flank of the Parpach front.

The best way to attack the enemy's operational center of gravity is by using an indirect approach in which commanders apply the principles of mass, economy of force, and maneuver in as skillful a manner as possible. Essentially, the indirect approach requires operational commanders to direct superior combat power onto the most decisive point or points of maneuver within a theater of operations, thereby forcing an opponent to change direction and accept battle under less than favorable conditions. Bustard Hunt is an excellent example of how the indirect approach works at the operational level. First, Manstein identified decisive points of maneuver along a narrow section of the weakly defended southern portion of the Parpach line, and on the left flank and rear of the two northernmost Soviet armies on the Kerch Peninsula. Next, he selected a course of action that called for fixing the Soviets in the north, penetrating the weakly held enemy line in the south, and then enveloping two Soviet armies in the north from their left flank and rear. On the other hand, during the initial stages of Crusader the British could not implement an indirect approach because of Cunningham's reluctance both to recognize Sidi Rezegh as the decisive point in the theater, and to select a course of action that would bring the bulk of his armored combat power to bear against it.

Notwithstanding the importance of selecting a course of action that incorporates the indirect approach, operational commanders must also protect their own centers of gravity by applying the principles of security and surprise in as skillful a manner as possible. This

protection is absolutely essential if a commander expects to defeat the enemy decisively, since in war "the heaviest blow is that struck by the center of gravity."[55] In particular, Crusader and Bustard Hunt illustrate vividly the effect of not protecting one's own center of gravity from the air attacks of an opposing force. During Crusader, one of Rommel's primary reasons for withdrawing Axis forces from the Tobruk area was the low combat effectiveness of Afrika Korps caused by the inability of the Luftwaffe to protect it from the relentless attacks of the Royal Air Force. During Bustard Hunt Kozlov was unable to shift the focus of his operational effort because of the inability of the Soviets to protect their command posts from the devastating attacks of the German VIII Air Corps. The destruction and damage of these command posts prevented Kozlov from generating any kind of operational reserve to blunt or cut off the XXX Corps penetration of his southern flank. In essence, the Germans attacked these posts to disorient and paralyze the Soviet's command, control, and communication (C^3) system in order to hasten the destruction of the Crimean Front's center of gravity - the Fifty-first and Forty-seventh Armies.

The essence of the issues discussed above have relevance for the U.S. Army in modern war. Most, if not all, of the considerations in identifying and attacking the enemy's center of gravity are as valid today as they were during World War II. More importantly, they are an integral part of AirLand Battle - a doctrine designed for maneuver warfare anywhere in the world. Therefore, it is important for U.S. Army operational level commanders and planners to understand the implications of these considerations which underlie the key concept of center of gravity.

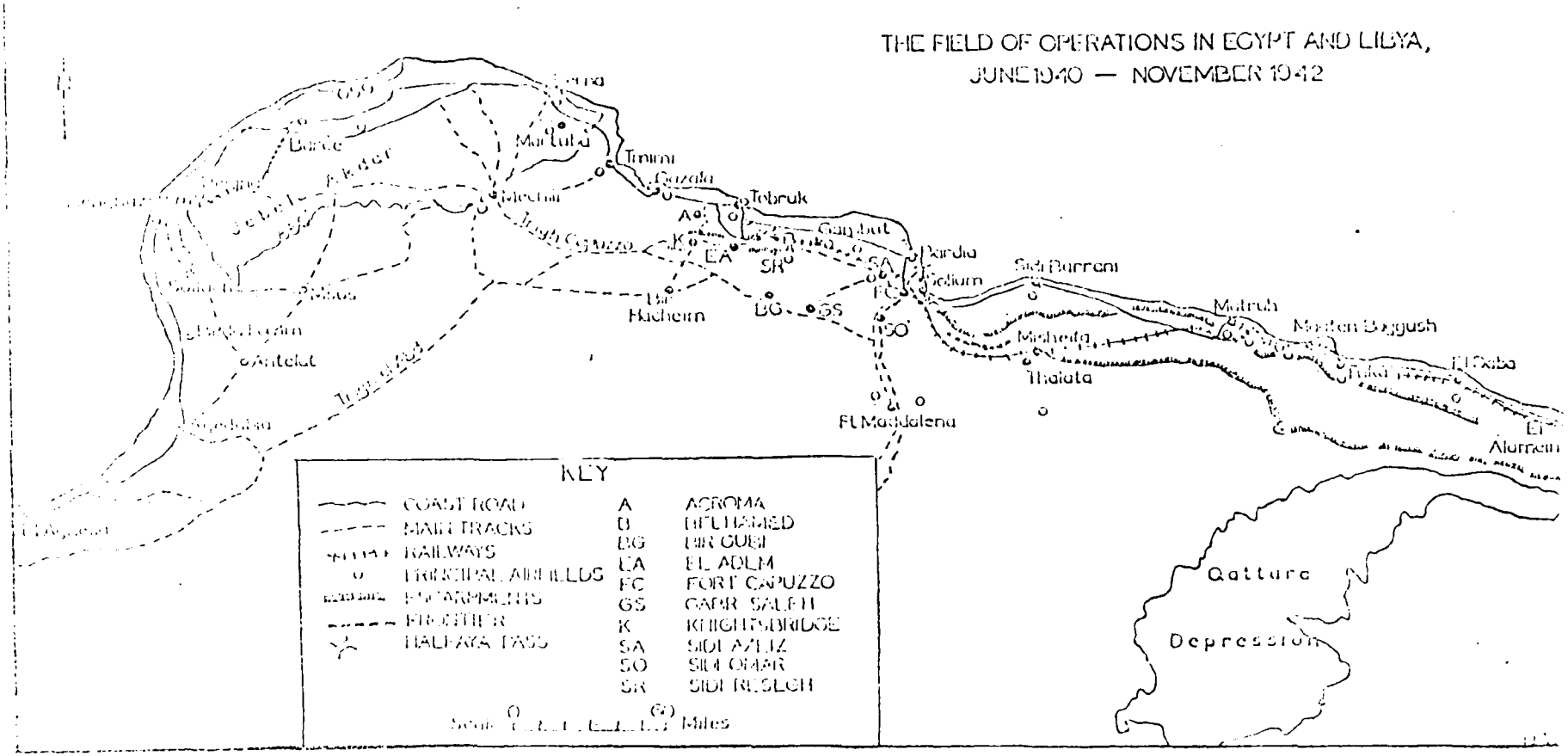
Operational commanders face a distinct challenge in trying to discern the enemy's center of gravity within a theater of operations. At best, it is a difficult task to determine which of the enemy's major formations is the true source of his strength or balance. In this regard, there are no formulas available to U.S. Army commanders, rather they must be prepared to weigh the merits of all factors that may have a bearing on the selection of an opponent's operational center of gravity.56 While most of these factors have been discussed in this paper, there may be others that a commander must consider during his process of identifying the enemy's center of gravity. Additionally, as part of this process, commanders must continually reassess the combat situation to determine if certain factors have changed, thereby causing the enemy's operational center of gravity to shift from one major formation to another (e.g., from a major committed formation to an operational reserve). Notwithstanding these challenges, if a commander can track the enemy's strength back to one source of power, he has taken the requisite first step in producing a military condition that is capable of achieving the strategic goal.

To achieve success at the operational level, particularly against a numerically superior adversary, U.S. commanders must attack the enemy's center of gravity indirectly by concentrating combat power at the decisive point or points of maneuver within a theater of operations. This will require commanders at the operational level to understand the interrelationship between the principles of mass, economy of force, and maneuver. These combat leaders must be willing to take calculated risks in allocating available combat power and executing operational maneuver. For

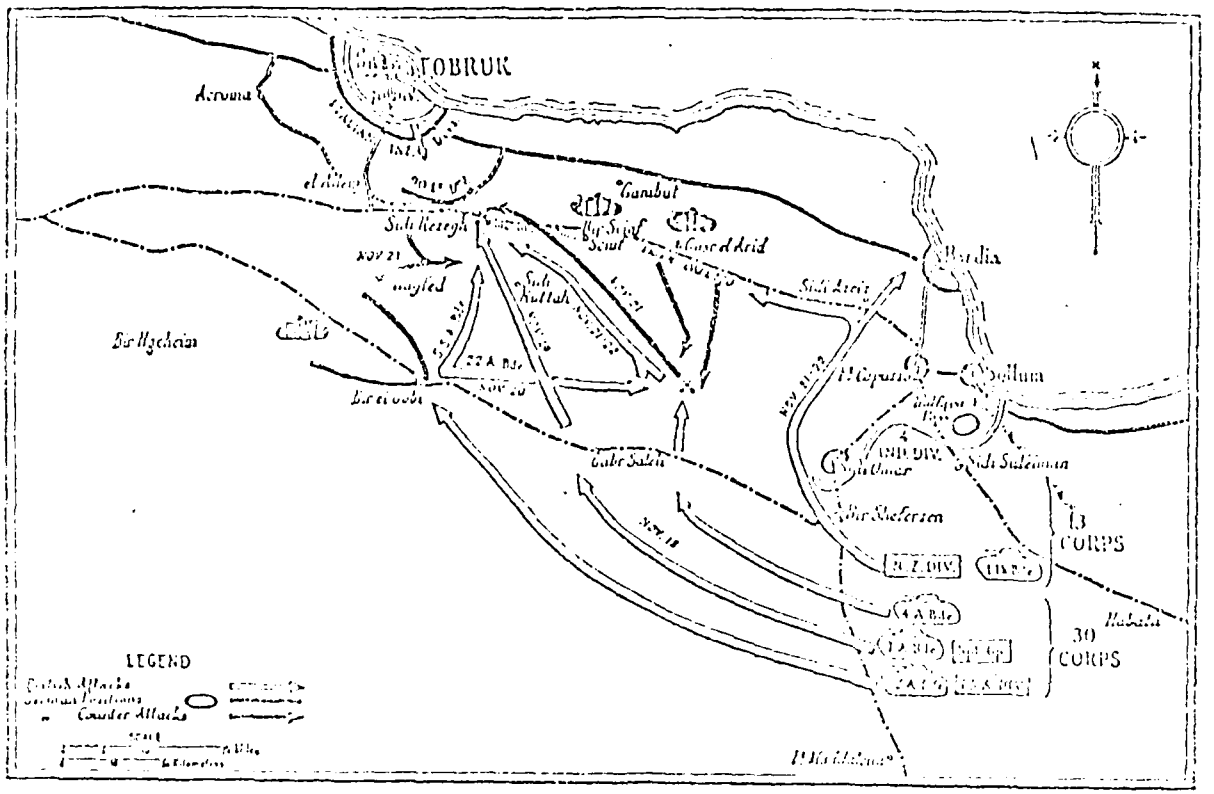
example, under certain circumstances, the operational commander may find it necessary to take a less critical unit's air, artillery, air defense, combat support, or combat service support assets to reinforce the main effort. Additionally, when conducting operational maneuver, he must be comfortable with the inevitable presence of open flanks, non-linear front lines, and economy of force sectors or zones. Finally, it will prove advantageous for commanders to allocate an adequate number of electronic warfare, artillery, and air assets for the express purpose of attacking enemy command posts. In this way, operational commanders can disrupt, disorient, and paralyze a number of critical nodes within an adversary's C3 system, thereby facilitating the destruction of a major formation previously identified as the enemy center of gravity.

Adequate protection of one's own center of gravity requires a joint or combined commander to place top priority on gaining air superiority within his theater of operations, or over selected portions of the theater. This may cause a reduction in the number of sorties available for battlefield air interdiction and close air support, however there may be no choice, since, as Rommel and Kozlov found out over forty years ago, an active and effective enemy air force can lower the combat effectiveness of one's own center of gravity to an unacceptable and irreversable level.

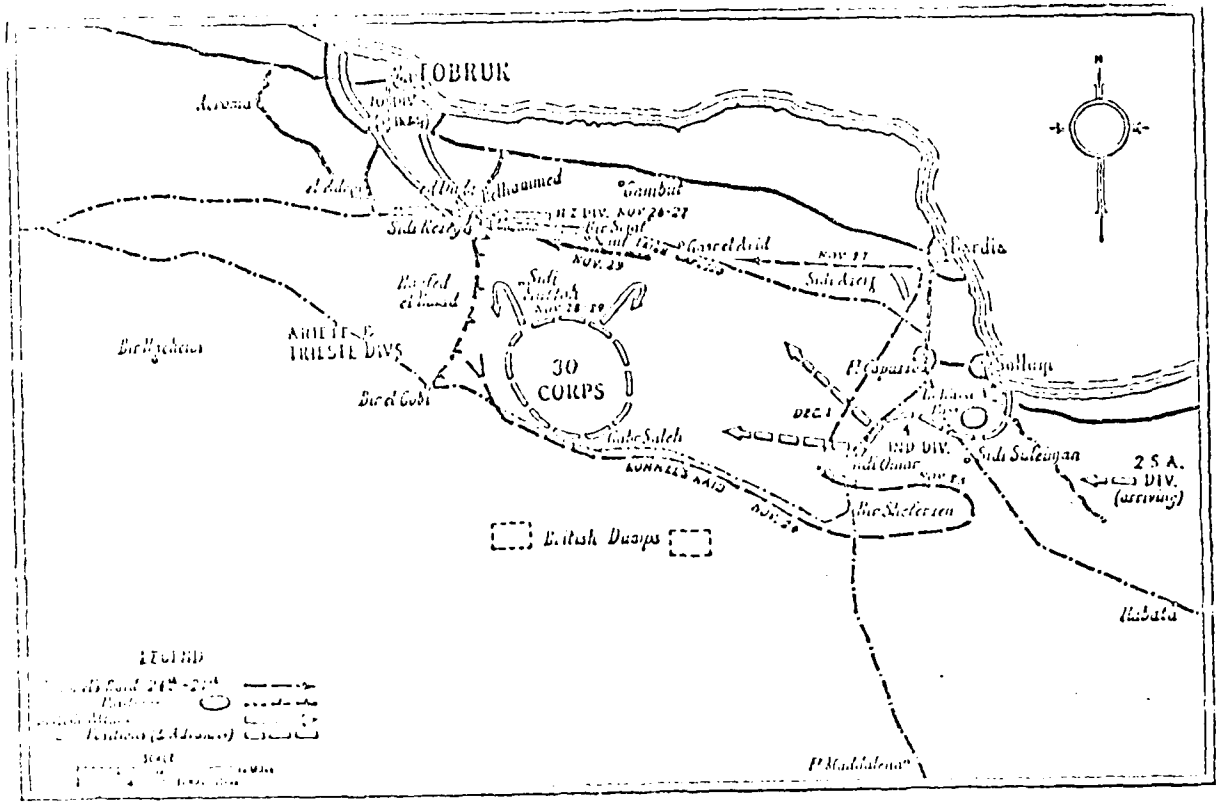
APPENDIX A



THE CAMPAIGN AREA

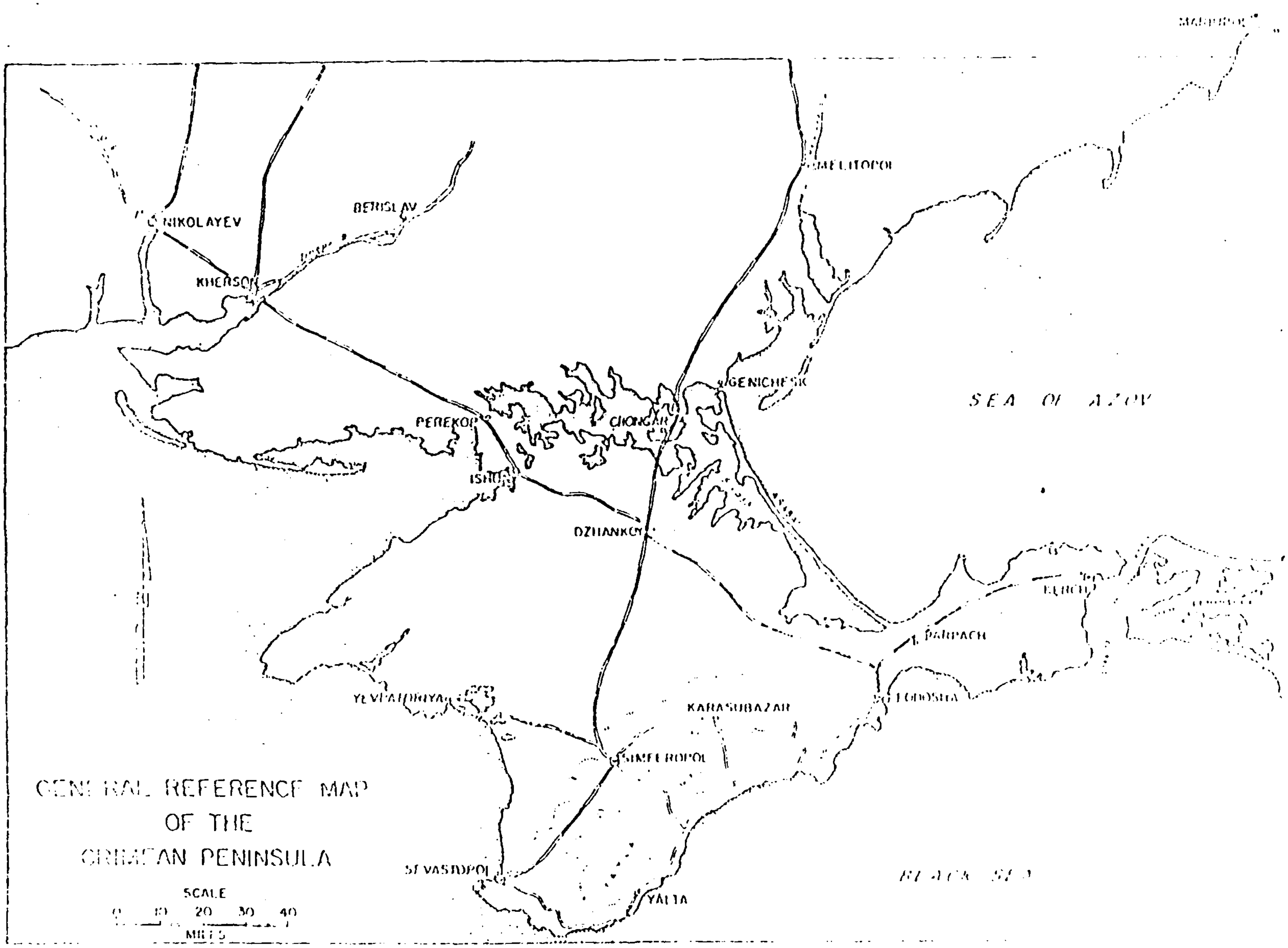


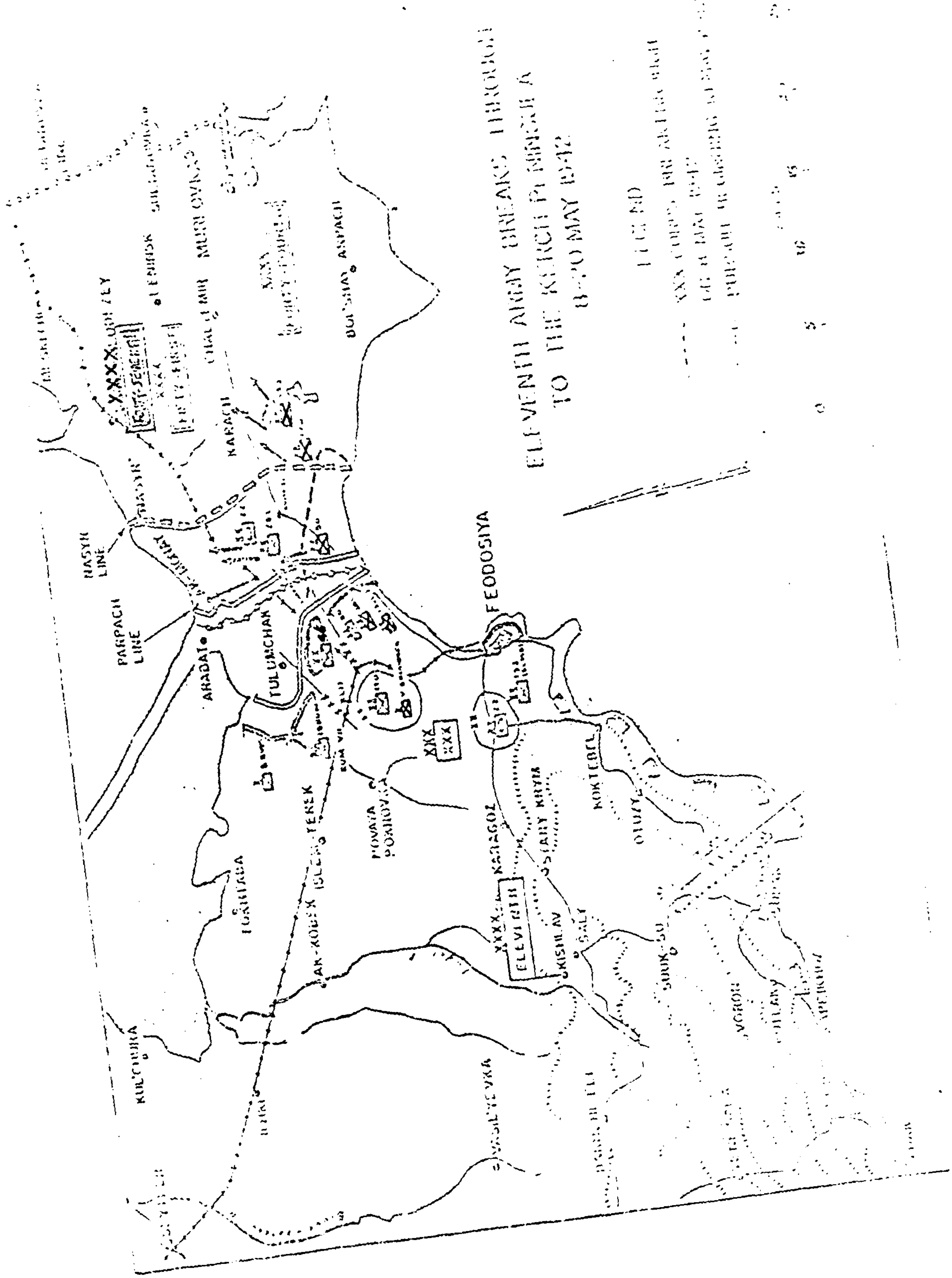
OPERATION "CRUSADER"
(18-23 November)



OPERATION "CRUSADER"
(24 Nov-1 Dec)

APPENDIX B


GENERAL REFERENCE MAP
OF THE
CRIMEAN PENINSULA
SCALE
0 10 20 30 40
MILES
NIKOLAYEV
BERISLAV
KHERSON
PEREKOP
CHONGAR
GENICHESK
DZHANKOY
KARASUBAZAR
SIMFEROPOL
YALTA


ELEVENTH ARMY BREAKS THROUGH TO THE KERCH PENINSULA
8-20 MAY 1942
LEGEND
FEODOSIYA
PARPACH LINE
NASYR LINE
ARABAT
TULUMCHAK
NOVAYA POKROVKA
KARAGOZ
STARY KRYM
KOKTEBEL
OTUZY
ELEVENTH
KARACH
BOL'SHAYA ASPACH
KIRCHIRA
TOKHTABA
SUUK-SU

ENDNOTES

1. Headquarters, Department of the Army, FM 100-5, Operations, (October 1985), p. 2-2. Understanding the definition of the strategic level of war is also important for U.S. Army officers practicing the operational art. The strategic level of war as currently defined by the U.S. Army is the level responsible for employing the armed forces of a nation or alliance to secure policy objectives by the application or threat of force. Military strategy sets the fundamental conditions of operations in war or to deter war.

2. Colonel Richard H. Sinnreich, U.S. Army AirLand Battle Briefing, School of Advanced Military Studies, (January 1986), p. 7.

3. FM 100-5, p. C-2.

4. Ibid., p. 2-3.

5. Ibid., p. 1-4.

6. Carl von Clausewitz, On War, edited and translated by Michael Howard and Peter Paret, (Princeton, N.J., 1984), pp. 595 and 596.

7. Ibid., p. 596.

8. Colonel Harry G. Summers Jr., On Strategy: The Vietnam War in Context, (Carlisle Barracks, Pennsylvania, 1982), p. 80.

9. Ibid., p. 82.

10. Ibid., p. 83.

11. Clausewitz, p. 596.

12. General Van Tien Dung, "Great Spring Victory," Foreign Broadcast Information Service (Volume II, FBIS-APA-76-131 7 July 1976), p. 52, as quoted in Colonel Harry G. Summers, On Strategy: The Vietnam War in Context, (Carlisle Barracks, Pennsylvania, 1982), p. 84.

13. Clausewitz, pp. 485 and 486.

14. Ibid., p. 485.

15. Ibid. Clausewitz reaches this conclusion after explaining his concept of victory and its sphere of influence. "Each victory has its own sphere of influence. If that sphere includes the whole of the enemy state - fighting forces, territory, and all - in other words, if all the components of his strength are carried away in the very torrent that has hit its core, that victory is all that is needed. The scale of a victory's sphere of influence

depends, of course, on the scale of victory, and that in turn depends on the size of the defeated force."

16. Michael Howard, "The Influence of Clausewitz"; p. 35, introductory essay to Carl von Clausewitz, On War, edited and translated by Michael Howard and Peter Paret (Princeton: Princeton University Press, 1984).

17. Clausewitz, p. 486.

18. Ibid.

19. Ibid., p. 486.

20. Clausewitz, pp. 213 and 541; FM 100-5, pp. 2-7 and 2-8, B-3 - B-6. Clausewitz defines maneuver as a play of balanced forces whose aim is to bring about favorable conditions for success and then to use them to gain an advantage over the enemy. FM 100-5 defines maneuver as the movement of forces in relation to the enemy to secure or retain positional advantage. Operational maneuver seeks a decisive impact on the conduct of a campaign. In this monograph the FM 100-5 definition of operational maneuver will apply in all cases. Clausewitz defines economy of force in terms of "always making sure that all forces are involved - always to ensure that no part of the whole force is idle." FM 100-5 defines economy of force as "allocating minimum essential combat power to secondary efforts." It is the reciprocal of the principle of mass. Unless otherwise noted, the FM 100-5 definition of economy of force will apply throughout this monograph. FM 100-5 defines mass as "concentrating combat power at the decisive place and time in order to achieve decisive results."

21. Clausewitz, p. 492; Howard, p. 41. Whereas Jomini spent many chapters in analyzing where and what the decisive might be, Clausewitz emphasized the importance of the commander having the coup d' oeil to distinguish the decisive point and the resolution to concentrate everything against it, stripping forces from secondary fronts and ignoring lesser objectives.

22. David G. Chandler, The Campaigns of Napoleon, (New York: Macmillan Publishing Co., Inc., 1966), p. 163.

23. Clausewitz, p. 196.

24. Clausewitz, p. 486.

25. Antoine Henri Jomini, The Art of War (Philadelphia: J.B. Lippincott & Co., 1862; reprint ed, Westport: Greenwood Press), translated by Mendell and Craighill, pp. 78 and 162; Sinnreich, p. 4. Jomini defines strategy as the activity of "directing armies to the decisive points of a zone of operations, and influencing, in advance, the results of battles." "Grand Tactics is the art of making good combinations preliminary to battle, as well as during their progress." "The guiding principle in grand

tactics and strategy, is to bring the mass of the force in hand against a part of the opposing army, and upon that point the possession of which promises the most important results." As Colonel Sinnreich points out in his AirLand Battle briefing, Jomini's definitions of strategy and grand tactics are the historical antecedents of the U.S. Army's current definition of operational art.

26. Jomini, p. 78.

27. Ibid., p. 79.

28. Ibid., p. 82.

29. Ibid.

30. FM 100-5, p. B-7 - B-9. The principle of security enhances freedom of action by reducing friendly vulnerability to hostile acts, influence, or surprise. Security may be achieved through the establishment and maintenance of protective measures against hostile acts or influence; or it may be assured by deception operations designed to confuse and dissipate enemy attempts to interfere with the force being secured. To a large degree, the priniciple of surprise is the reciprocal of the principle of security. Concealing one's own capabilities and intentions creates the opportunity to strike the enemy unaware or unprepared. Surprise results from going against an enemy at a time and/or place or in a manner for which he is unprepared. Factors contributing to surprise include speed and alacrity, employment of unexpected factors, effective intelligence, deception operations of all kinds, variations of tactics and methods of operation, and operations security.

31. Major Glen L. Scott, Considerations for Deep Maneuver: Lessons From North Africa, 1941-1942. Master of Military Art and Science Thesis, Command and General Staff College, Fort Leavenworth, Kansas, (May 1985), p. 9.

32. Ibid., pp. 64 and 65.

33. Major General J.F.C. Fuller, The Second World War, 1939-1945. (New York: Duell, Sloan and Pearce, 1949), p. 155.

34. Scott, p. 67.

35. Erwin Rommel, The Rommel Papers. Edited by B.H. Liddell Hart. 15th ed. (New York: Harcourt and Brace, 1953; reprint ed., New York: DaCappo Press, 1983), p. 156.

36. Major General F.W. von Mellenthin, Panzer Battles (New York: Ballantine Books, 1980), p. 71; Scott, p. 68.

37. Scott, p. 68.

38. Ibid.

39. Lieutenant General Sir Alan Cunningham, They Sought Out Rommel, p. 4, as quoted in Correlli Barnett, The Desert Generals, (Bloomington, Indiana, 1982), p. 82.

40. Fuller, The Second World War, p. 164.

41. Mellenthin, pp. 75 and 78. The brigade was the 7th Armored Brigade which had moved from the Gabr Saleh area on 19 November. The 7th Support Group was the 7th Armored Division's anti-tank and artillery unit. It had thirty-six 2-pounder antitank guns, and thirty-six 25-pounders.

42. FM 100-5, pp. C-3 and 2-10. Protection of one's own center of gravity is an important aspect of operational art. Once Crusader began, 7th Armored Division, the spearhead of XXX Corps, with its three tank brigades was the British operational center of gravity. The security and deception measures described in the paper contributed greatly to "conserving the fighting potential of XXX Corps so that it could be applied at the decisive time and place" against the Axis center of gravity (i.e., Afrika Korps). However, as the paper goes on to describe, the British were unable to concentrate superior combat power at the decisive time and place against the German armor.

43. B.H. Liddell Hart, History of the Second World War (New York: Capricorn Books, 1972), p. 189.

44. Mellenthin, p. 89.

45. David Irving, The Trail of the Fox (New York: Avon Books, 1978), p. 170.

46. Major General Ian S.O. Playfair, The Mediterranean and Middle East, vol 3, History of the Second World War, United Kingdom Series (London: Her Majesty's Stationary Office, 1960), p. 52.

47. Scott, p. 86.

48. Clausewitz, p. 485.

49. Field Marshal Erich von Manstein, Lost Victories (Novato, California: Presidio Press, 1982), pp. 210 and 233.

50. Porter Randall Balkemore, Manstein in the Crimea: The Eleventh Army Campaign, 1941-1942, Doctoral Dissertation, University of Georgia, Athens, Georgia, (1979), p. 12-7-2.

51. Ibid., p. 12-7-5.

52. Ibid., p. 12-7-4.

53. Ibid., p. 12-7-9.

54. Ibid., p. 12-7-11.

55. Clausewitz, p. 485.

56. In trying to determine the enemy's operational center of gravity, a commander must consider a number of factors pertaining to all major formations that are part of his adversary's overall force. Specifically, the commander must consider the size, strength, cohesion, location, direction of advance, and intended direction of advance of each of the enemy's major formations. Additionally, he must assess the military capabilities of each formation in light of the theater of operations' geographical configuration and terrain. Finally, the operational commander must assess the overall character of the opposing commanding general. Interestingly, when addressing the subject of how to determine the enemy's operational center of gravity in On War, Clausewitz discusses only two criteria - the cohesion of the different enemy masses and the character of their commanding generals. This emphasis on two criteria only is not surprising, because in Clausewitz's time there was very little difference in the military capability of the various enemy masses (i.e., there was little variance in weapons, tactics, and levels of training of these different masses). On the other hand, during World War II there were usually significant differences in the weapons, tactics, and levels of training of the various major formations within the Allied and Axis Armies.

BIBLIOGRAPHY

BOOKS

Barnett, Correlli. The Desert Generals. Bloomington: Indiana University Press, 1982.

Chandler, David G. The Campaigns of Napoleon. New York: MacMillan Publishing Co., Inc., 1966.

Esposito, Brigadier General, USA (Ret.), Vincent J. The West Point Atlas of American Wars, Vol II, 1900-1953. New York: Praeger Publishers, 1972.

Fuller, Major General J.F.C. The Second World War, 1939-1945. New York: Duell, Sloan and Pearce, 1949.

Irving, David. The Trail of the Fox. New York: Avon Books, 1978.

Jomini, Baron Antoine Henri de. The Art of War. Translated by G.H. Mendell and W.P. Craighill. Philadelphia: J.B. Lippincott and Co., 1862; reprint ed., Westport: Greenwood Press Publishers, 1971.

Liddell Hart, B.H. History of the Second World War. New York: Capricorn Books, 1972.

Playfair, Major General Ian S.O. The Mediterranean and Middle East, vol 3. History of the Second World War, United Kingdom Military Series. London: Her Majesty's Stationary Office, 1960.

Rommel, Erwin. The Rommel Papers. Edited by B.H. Liddell Hart. 15th ed. New York; Harcourt and Brace, 1953; reprint ed., New York: DaCappo Press, 1983.

Summers, Colonel Harry G. On Strategy: The Vietnam War in Context. Carlisle Barracks, Pennsylvania.

van Creveld, Martin. Supplying War: Logistics from Wallenstein to Patton. Cambridge: Cambridge University Press, 1977.

von Clausewitz, Carl. On War. Edited and translated by Michael Howard and Peter Paret. Princeton: Princeton University Press, 1984.

von Manstein, Field Marshal Erich. Lost Victories. Novato, California: Presidio Press, 1982.

von Mellenthin, Major General F.W. Panzer Battles. New York: Ballantine Books, 1980.

Willoughby, Lieutenant Colonel Charles Andrew. Maneuver in War. Harrisburg, Pennsylvania: The Military Service Publishing Co., 1939.

GOVERNMENT DOCUMENTS

Headquarters, Department of the Army. FM 100-5, Operations (Final Draft). Washington D.C., October 1985.

Scott, Major Glen L., Considerations for Deep Maneuver: Lessons From North Africa, 1941-1942. Master of Military Art and Science Thesis, Command and General Staff College, Fort Leavenworth, Kansas, May 1985.

Sinnreich, Colonel Richard H., Director, School of Advanced Military Studies, Fort Leavenworth, Kansas. U.S. Army AirLand Battle Briefing, January 1986.

PERIODICALS AND ARTICLES

Franz, Colonel Wallace P., "Operational Concepts," Military Review, July 1984, pp. 3-15.

MISCELLANEOUS

Balkemore, Porter Randall. Manstein in the Crimea: The Eleventh Army Campaign, 1941 -1942. Doctoral Dissertation. Athens, Georgia: University of Georgia, 1979.

Schneider, James. The Exponential Decay of Armies in Battle. Theoretical Paper # 1. Fort Leavenworth, Kansas: U.S. Army Combined Arms Operations Research Activity, 1984.

SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT APPROVED FOR PUBLIC RELEASE DISTRIBUTION IS UNLIMITED
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S)

6a. NAME OF PERFORMING ORGANIZATION US ARMY COMMAND AND GENERAL STAFF COLLEGE	6b. OFFICE SYMBOL (If applicable) ATZL-~~SWD-GD~~ SWV	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State, and ZIP Code) FORT LEAVENWORTH, KANSAS 66027-6900		7b. ADDRESS (City, State, and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION	8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)		10. SOURCE OF FUNDING NUMBERS

PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.	WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)
CONSIDERATIONS IN IDENTIFYING AND ATTACKING THE ENEMY'S CENTER OF GRAVITY

12. PERSONAL AUTHOR(S)
GRISWOLD, MYRON J., MAJ, US ARMY

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
MONOGRAPH	FROM ______ TO ______	1986, MAY, 14	44

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	CENTER OF GRAVITY; MILITARY THEORY; OPERATIONAL LEVEL OF WAR; DECISIVE POINT; PRINCIPLES OF WAR

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Central to the design and conduct of campaigns and major operations is the concept of center of gravity. However, a thorough understanding of this concept seems to be lacking within the U.S. Army. While some of this misunderstanding exists because of the Army's overall unfamiliarity with operational art, much of it can be traced to the inherent complexity of the concept of center of gravity. Therefore, the purpose of this study is to discern the key considerations that operational commanders and planners must understand to identify and attack the enemy's operational center of gravity.

Following an evaluation of the theoretical propositions of Clausewitz and Jomini that pertain to the concept of center of gravity, the study analyzes in detail two World War II operations - the 1941 *Crusader* and 1942 *Bustard Hunt* operations - in order to identify insights and lessons applicable to center of gravity at the operational level. The analysis discloses

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED

22a. NAME OF RESPONSIBLE INDIVIDUAL	22b. TELEPHONE (Include Area Code)	22c. OFFICE SYMBOL
Maj Myron J. Griswold	913-684-2138	[illegible]

DD FORM 1473, 84 MAR — 83 APR edition may be used until exhausted. All other editions are obsolete.

SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED

CONTINUATION OF BLOCK 19

that the enemy's operational center of gravity his source of strength or balance, is always some mass of his overall force - a mass capable of producing a decisive that has operational consequences. It is most in a major formation, such as a division, corps, army, or group of armies, that is the main element of a larger force's power for undertaking decisive offensive or defensive action within a theater of operations. Additionally, the best way to attack the enemy's operational center of gravity is for commanders to use an indirect approach in which they concentrate combat power at the most decisive point or points within a theater of operations. Finally, the protection of one's own center of gravity requires the skillful application of the principles of security and surprise. In this regard, it is particularly important to protect one's own center of gravity from the air attacks of an opposing force.

END

12-86

DTIC